PETROLOGICAL NOTES ON VARIOUS NEW SOUTH WALES ROCKS.

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i. *Rocks of Nullum Mountain, near Murwillumbah.*

Some years ago, the writer spent a day at Murwillumbah, and examined Nullum Mountain, which lies five miles to the south-west of the town. Nothing yet has appeared concerning the geology of this area, so that a few notes may be given here to call attention to the spot. The mountain forms a short ridge, standing prominently in front of the range. Its relief is due to the presence of an inclined sheet of granophyre, which dips towards the north. The main mass of the mountain is composed of gnarled slaty rocks of the Brisbane Schists, of Lower Palæozoic or even earlier age. The inclined sheet outcrops on the southern side of the ridge, and is exposed on the northern slopes of the mountain for some distance down its face. At the base, various dykes have been noted. The sill consists chiefly of granophyre composed of small crystals of orthoclase and acid plagioclase, partly allotriomorphic, partly idiomorphic, surrounded by a granophyric intergrowth of quartz and orthoclase. A little biotite occurs and magnetite, but the bulk of the ferromagnesian constituents are altered into regular patches and spherulites of chlorite, and grains of epidote. A few apatite crystals are also present.

The rock of the upper surface of the sheet exposed on the north slope shows frequently no granophyric structure, but has a trachytic habit. It consists of a pilotaxitic felt of felspar-laths, both orthoclase and acid plagioclase, and frequently an untwinned felspar of the same refractive index as Canada balsam, possibly anorthoclase, together with a fair amount of interstitial quartz. The

pyroxene is a normal grey augite, forming small prisms more or less altered to chlorite and epidote, magnetite and ilmenite in small grains and plates. Xenocrysts are present, that seem to have been derived from a dolerite: they may occur aggregated or singly, and are rather corroded. The basic plagioclase is being replaced by irregular patches of albite; the pyroxene is a grey augite, with a basal striation and varying optic axial angle, sometimes large, but in two instances almost 0°. This indicates that it is an enstatite-augite. Large plates of ilmenite occur also. The vesicles of the rock are filled with quartz and chlorite.

The majority of the dykes on the north face of the mountain are trachyandesites, related to the last rock. They are fine-grained green rocks, showing phenocrysts of plagioclase and orthoclase in a matrix of laths of the same minerals. The coloured constituents have been largely decomposed, but are sometimes seen to be minute prisms of grey augite, with rarely large chlorite-pseudomorphs after the same mineral; the extinction-angle of these pyroxenes is quite high; alkaline pyroxenes or amphiboles are not recognisable. Magnetite occurs in large and in very minute grains. Considerable variation is seen in the grainsize of the ground-mass, and in the proportion between the potash and lime-soda felspar, the decrease in the former indicating a passage towards the andesites.

A quite different type of dyke occurs in a road-cutting near the foot of the mountain, adjacent to one of the more basic green dykes. It consists entirely of colourless minerals, being a very fine-grained mixture of andesine, quartz and a minor amount of orthoclase, with a few small phenocrysts of quartz and andesine. The rock is much obscured by sericite.

One cannot be certain yet of the affinities of these rocks. From a macroscopical examination of the writer's collection, Dr. Jensen* considered that they might be riebeckite-trachytes, and he himself found dykes of alkaline trachyte in the neighbourhood of Murwillumbah; the microscopical study, however, has not confirmed the presence of riebeckite.

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* Report Aust. Assoc. Advt. of Science, 1911, p. 193.

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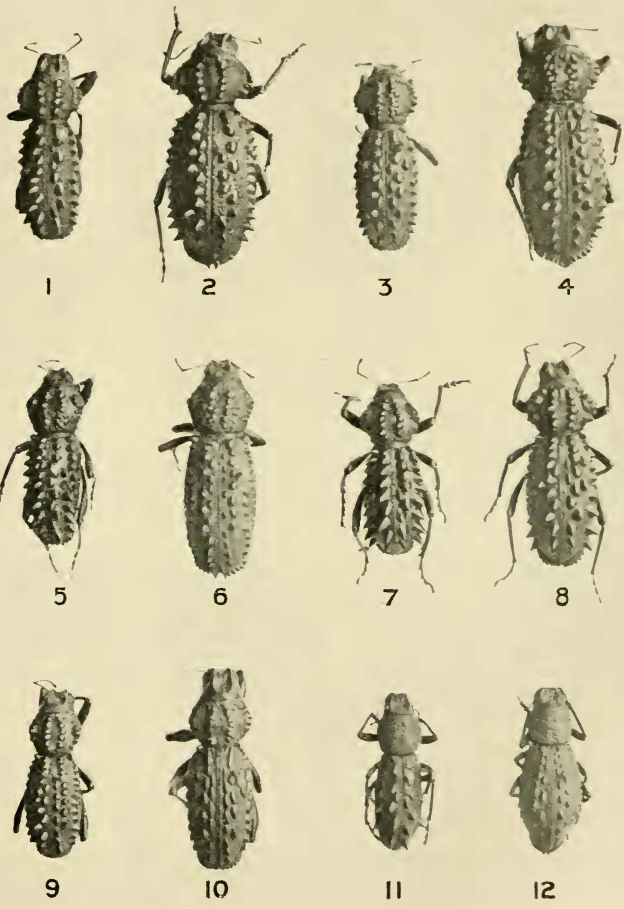
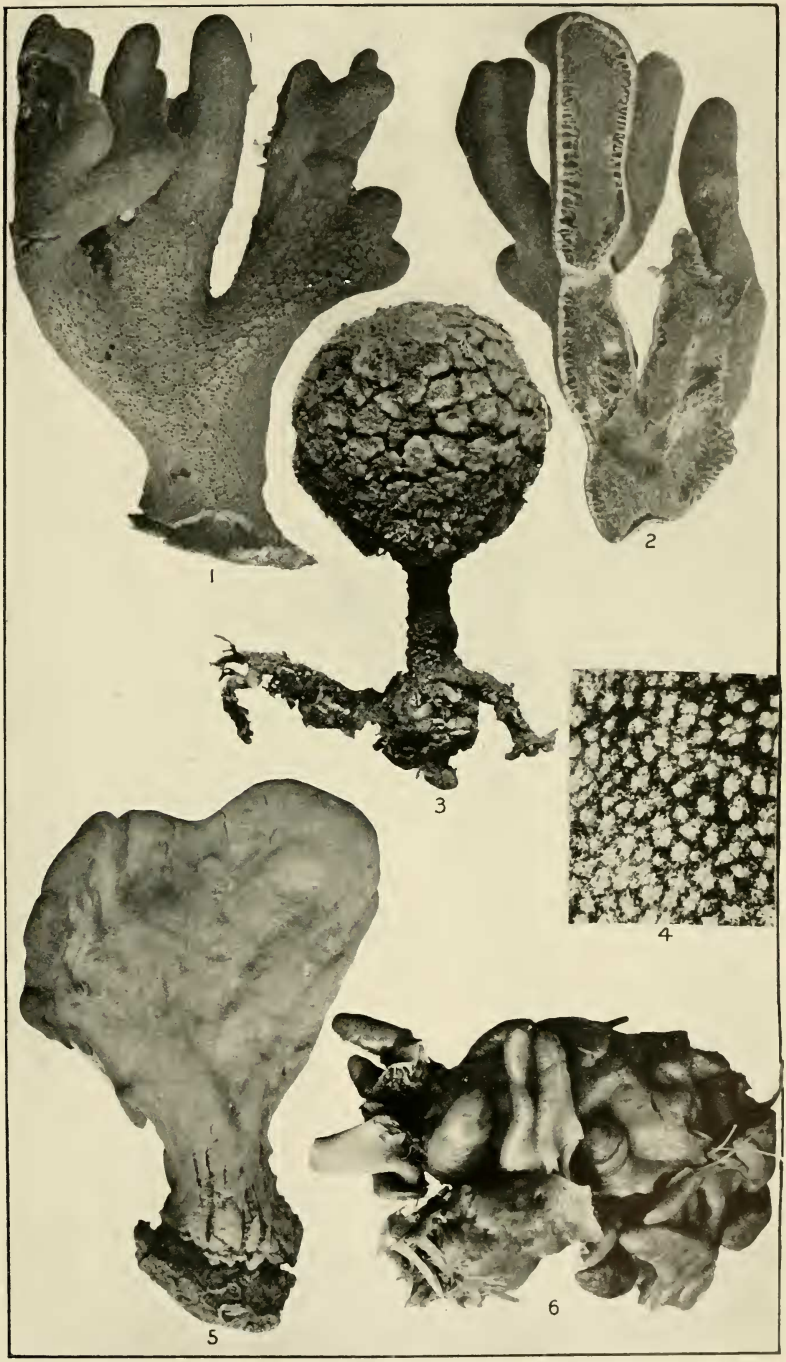
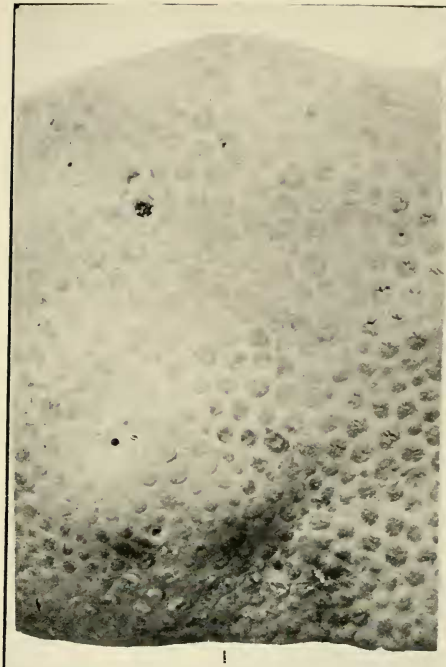


Macramycterus spp.



Sollasella, Donatia, Spirastrella, Polymastia.



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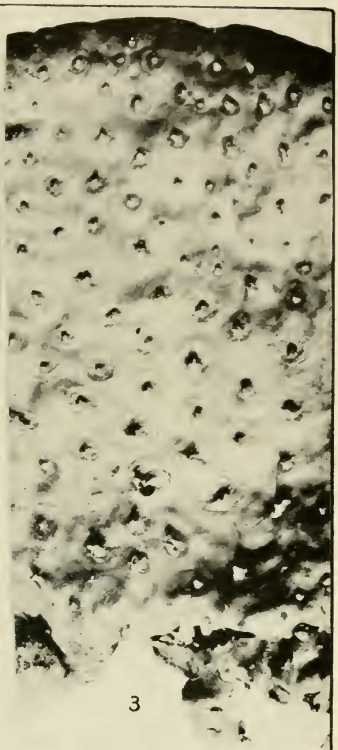

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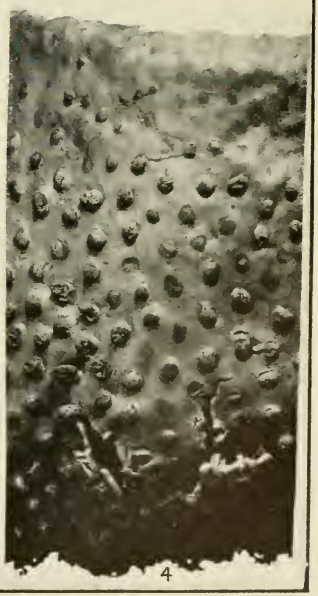

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Cliona (Papillissa).